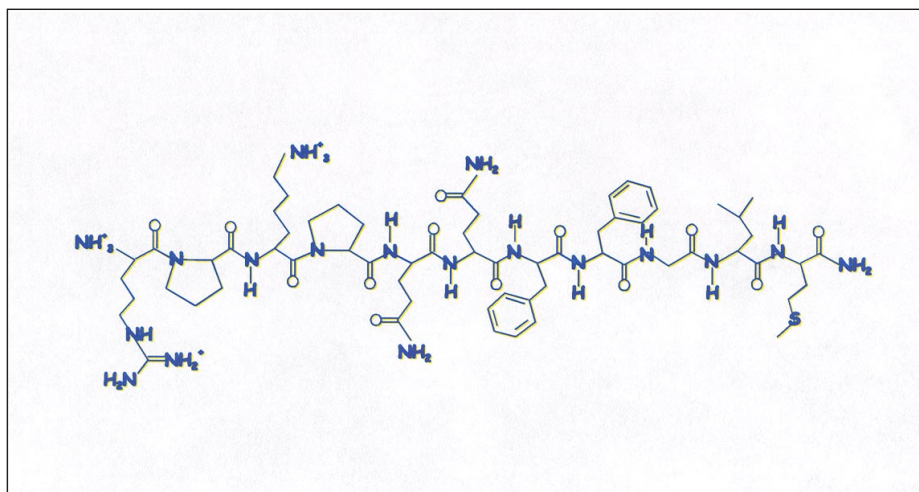




PROTEIN IDENTIFIED THAT PROTECTS AGAINST TOXICITY OF JET FUEL AEROSOL

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Payoff

Research conducted on a synthetic analog of mammalian protein known as Substance SP, will help explain how chemicals and mixtures of chemicals can damage human tissue. Understanding this mechanism may be of value in identifying specific, tissue-damaging chemicals within JP-8 which could aid in designing safer new fuels.

Accomplishment

Under a research program sponsored by the Air Force Office of Scientific Research, University of Arizona researchers discovered that a simple mammalian protein, called SP, may protect humans from damage to the lung and immune system caused by JP-8 jet fuel aerosol. The protective benefit also occurs even if SP is administered after exposure to the fuel aerosol.

Background

Using a synthetic analog of SP, Dr. Mark Witten observed that an aerosol application of the substance offered complete protection for mice against JP-8 induced lung injury. SP protected the mice even if it was administered after they were exposed to the fuel aerosol. In another experiment, set up to confirm SP's role in protecting the lung, the researchers exposed mice to the same aerosol but then chemically blocked SP activity in the lung. This action exacerbated the tissue damage — leaky lungs — and impaired breathing function — and thus confirmed SP's protective role. In a similar experimental approach, Dr. David Harris studied SP's effect on JP-8 induced changes to the immune system in mice. JP-8 can reduce organ weights and the number of immune cells, can alter immune cell populations, and can cause functional changes in the immune system. Dr. Harris found that SP treatment shielded immune cells from jet fuel-induced reductions in both number and function. This, in turn, triggered trial studies to examine the potential anti-AIDS and anti-cancer effects of SP. In these studies, SP actually delayed the onset of viral effects and reduced the spread and growth of cancer cells in mice. Drs. Witten and Harris have patented the use of SP as an inhalation aerosol therapy.